

ABSTRACT OF THE INVENTION

The present invention relates to a Raman amplifier and the like which has a structure capable of easily improving the transient response characteristic without depending on the added/dropped signal channels. In the Raman amplifier, a pumping light source supplies forward pumping light of wavelength  $\lambda_{p0}$  to a Raman-amplifying optical fiber. A pumping light source supplies N-channel backward pumping light of wavelengths  $\lambda_{p1}-\lambda_{pN}$  to the Raman-amplifying optical fiber. The wavelength  $\lambda_{p0}$  of the forward pumping light is less than or equal to the shortest wavelength of the channel wavelengths  $\lambda_{p1}-\lambda_{pN}$  of the backward pumping light. In particular, the power of the backward pumping light and the power of the forward pumping light are arranged such that the effective length  $L_{eff}$  of the Raman-amplifying optical fiber for the channel wavelengths  $\lambda_{p1}-\lambda_{pN}$  of the backward pumping light becomes longer than the actual length L.